

# Future Battle: The Merging Levels of War

DOUGLAS A. MACGREGOR

Warfighting doctrine is one of the most sensitive instruments of national security policy.<sup>1</sup> In this essay, we shall explore the doctrinal implications of change within the conceptual framework of the three levels of war—strategic, operational, and tactical. The analysis suggests that in the future, the technologically altered battlefield dimensions of time and space will merge the three levels of war into a single new structure for the integration of complex air-land-sea combat operations. Linked to this greater scope for directing joint simultaneous offensive operations is the emerging capability to immediately convert tactical success on the battlefield into decisive strategic results.

Before tackling the issue of future war, however, we need to take a selective glance at wars of the past. Although a detailed account of the evolution of modern warfare is beyond the compass of this essay, it is possible to infer the general contours of change in the levels of war from the evidence provided by three watershed events in military history: Napoleon's Ulm campaign in 1805, the German blitzkrieg against France in 1940, and the American-led Operation Desert Storm in 1991. Such a review will establish a basis for judging the extent to which the levels of war are evolving into a new conceptual structure diverging dramatically from all previous experience.

Recognition of this evolution is important. At the outset of World War II, far too many officers failed to realize that the time and space factors prevalent in World War I were outmoded and irrelevant. They grasped too late modern warfare's potential for accelerated reaction time and extended battlefield space. They were thus unable to adapt and adjust to the new requirements of wartime leadership.<sup>2</sup> The Army's officer corps can not afford to repeat this experience in the future.

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>1992</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-1992 to 00-00-1992</b>	
4. TITLE AND SUBTITLE <b>Future Battle: The Merging Levels of War</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>U.S. Army War College,ATTN: Parameters,122 Forbes Avenue,Carlisle,PA,17013-5238</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT  <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES  <b>15</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			

## *The Evolving Levels of War*

After the Napoleonic wars ended, numerous military observers set out to make Napoleon's military genius intelligible. Since Napoleon never committed his conceptual approach to war to writing and none of his marshals or generals produced any significant system of thought about his conduct of war,<sup>3</sup> analysts like Swiss Baron Antoine Henri de Jomini and Carl von Clausewitz went directly to the historical record of Napoleon's campaigns. Recognition of the three levels of war derives ultimately from these exhaustive studies, though the term "operational" is a comparative latecomer, entering the literature with Helmuth von Moltke during the period 1858-88.<sup>4</sup> Strategy relates to broad questions affecting the allocation and disposition of national and multinational forces in war, while tactics specifies measures to be taken when opposing forces collide on the battlefield. The operational level exists to explain the nature of command at a level where the establishment or pursuit of strategic objectives and the tactical employment of large forces are linked.<sup>5</sup>

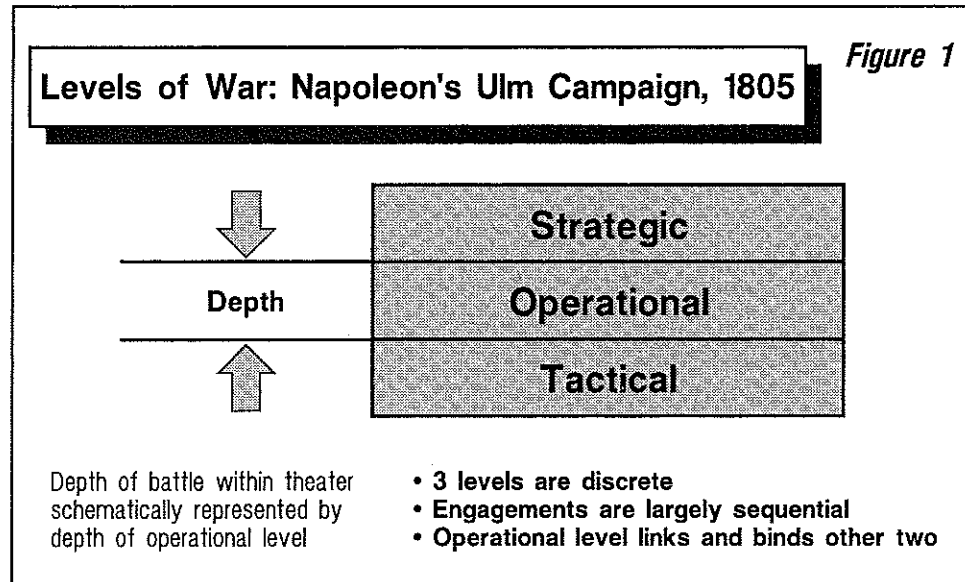
Of Napoleon's campaigns, none is more important to an understanding of modern warfare than the Ulm campaign of 1805. Alerted by French intelligence agents to Austrian and Russian military mobilization, Napoleon moved his 200,000 troops 300 miles from their encampment in Boulogne in a wide envelopment along multiple axes across western Europe to converge on the Austrian rear in Ulm. Thanks to careful French diplomacy, strict security measures, and the elimination of the French army's dependence on fixed supply points, the operation was completed in only seven weeks.

Separate corps-size elements were given independent missions with mutually supporting objectives. Occupied with a 30,000-man French cavalry screen in the Black Forest region, the Austrians unwisely discounted the possibility that the majority of French forces would advance on a broad concentric front over difficult terrain. Surprised and isolated by the crushing rapidity of the French advance and by the presence of the French army far behind their front, the Austrian forces at Ulm were compelled to surrender. Yet, the Ulm campaign was not only an overwhelming victory for the French, it also had the decisive effect of setting the terms for Napoleon's subsequent battle with the combined Austrian and Russian armies at Austerlitz in December of the same

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year—a titanic action which ended with the virtual destruction of the Austro-Russian armies.<sup>6</sup>

Two key points emerge from this brief historical review. First, prior to Ulm armies were generally small and the battlefield rather than the theater of war was the commander's arena. Social and industrial revolution in France radically changed this condition and created both mass armies and the means to mass-produce standardized weapons and supplies. Second, Napoleon's appreciation of these new battlefield dynamics enabled him to wage a war of greater spatial scope and duration. Moreover, Napoleon's willingness to delegate command, to accelerate the tempo of operations, to risk dispersion on the approach march, and to concentrate large, independent bodies of troops at critical points on the battlefield produced a relatively inexpensive victory in terms of French human and materiel resources as well as a new conception of time and space. Of course, for full effect, Napoleon had to ensure that the points in time and space which were selected for attack had a strategic impact. Napoleon's acute sense of timing and the depth of his operational focus guaranteed that the effect of the whole French campaign was greater than the sum of its individual parts—single engagements, actions, and battles. Under the weight of Napoleon's strategic offensive, the Austrians imploded and their will to resist collapsed.

Interpretation of Napoleon's conduct of the Ulm campaign may be illustrated visually in terms of three discrete levels of war (Figure 1), where depth and simultaneity of operations become the chief defining variables (with operational tempo a close correlate). In this setting, Napoleon, who was both French head-of-state and army commander-in-chief, translated his vision of the

national strategic aim into the practical application of force on a theater-wide basis. Strategically focused, sequential operations and engagements culminated finally in a decisive blow to destroy the enemy's armed might.

Unsurprisingly, the synergistic effect of Napoleon's campaign strategy became the organizing imperative of the great offensive campaigns of the late 19th and early 20th centuries. Analyses of subsequent Prussian-German campaign strategy in 1866, 1870, 1914, and 1940, for example, revealed that the intent of the Prussian and German opening operations was to repeat Napoleon's achievement in the Ulm campaign of 1805. They sought to bring on a battle of annihilation by inflicting a strategic defeat on the enemy which his tactical measures could not remedy. For that matter, later Soviet concepts of theater-wide offensive operations were also logical successors in a series of attempts to replicate Napoleon's victory on an even larger scale.<sup>7</sup>

It was, however, not until the innovative application of automotive, aviation, and communications technology to military use in the context of the 1940 German blitzkrieg that the operational dimensions of time and space were again subject to radical change. The details of the German plan to execute an armored sweep through the Ardennes to the French coast and split the Allied armies in two are too well known to recount here. But it is worth noting that the failure of the German 1918 offensives to achieve similar aims had fostered a compulsion for self-examination that led to a keen appreciation in the German officer corps for the potential impact of new technology on the battlefield dimensions of time and space.

In 1933, an obscure German General Staff officer named Heinz Guderian wrote about the use of tank forces in future war: "The manner of its engagement is not in prolonged battles, but short well-timed operations launched by brief orders. The principle of surprise [is essential] in order to avoid or avert enemy defensive action."<sup>8</sup> It was no accident that when war came, the interwar deliberations on the potential impact of changing battlefield dynamics enabled the Germans to exploit radio communications, aircraft, and tracked-vehicle technology in order to change plans minute by minute in the face of enemy opposition.

For the first time, real-time communications allowed operational commanders to coordinate directly with their tactical leaders on the battlefield. This accelerated response time between tactical and operational leaders, as accentuated by quicker movement of maneuver and support elements, lent new and critical significance to the place in the enemy's front where the least resistance was encountered. Once probes revealed a weak spot in the enemy's horizontally organized front, German armored columns could shift to that point quickly, attacking on a narrow front to cut lines of communication, overrun enemy command and control nodes, and immobilize the enemy defense system. Predictably, this new war of movement that spon-

taneously set up objectives, by-passed resistance, and reinforced success left the enemy wondering where the German armor was actually going!

In the case of General Guderian's assault across the Meuse River at Sedan on 13-14 May 1940, heavy strategic air assets were concentrated for employment at the operational level in a four-hour attack to support the three-Panzer division assault that split the Anglo-French front.<sup>9</sup> When the breakthrough came, Guderian's decision to turn northward and advance on the English Channel with only a part of his force permanently captured the strategic initiative for the Germans. Much like the Austrian command structure in 1805, the French command's resolve to fight quickly vanished under the intensity of the German onslaught. Relative to their opponents, German casualties were light, and the cost to their materiel resources was remarkably small.

Such an event reveals differences in methods of command, in the ways new technology is exploited, and in the preparation of forces for combat, all of which endowed the 1940 blitzkrieg with an advantage in the observation-decision-action cycle.<sup>10</sup> Whereas the British, American, and French armies of the period calculated the speed of any combined-arms unit as that of the slowest element, the German generals measured it by that of the fastest—the tank—and insisted that their divisions move as rapidly as possible.<sup>11</sup> Aviation allowed for the deep attack of many targets far beyond the visual range of attacking ground forces, helping to further incapacitate the enemy's strategic resources by destroying critical warfighting and industrial facilities. Air power also supplanted artillery as the principal means of fire support for attacking armored forces in order to sustain the momentum of the armored thrusts. Consequently, evolving concepts of time and space combined with innovative technology to stretch the battlefield further and to create a warfighting environment which was critically unbalanced in favor of the attacking German armies.

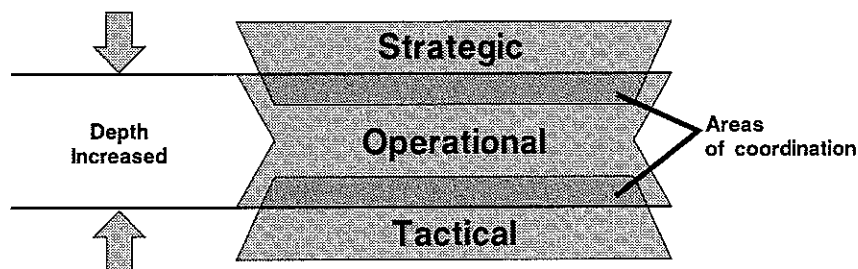
In this second evolution of the levels of war (Figure 2), blitzkrieg entailed a distinct overlapping of strategy and tactics by operational activity. Continuous coordination among commanders at the three levels permitted the achievement of multiplied effects of mobile air-land operations. While instantaneous communications resulted in the opportunity to exploit unanticipated battlefield success, the progressive extension of the battlefield through track and aviation systems also reduced the time for decisionmaking and accelerated the rate at which units move and events occur in war.

### *The Transition in Doctrinal Thought*

Much like Napoleon's Ulm campaign and the German blitzkrieg, the campaign to liberate Kuwait was no true military contest. It was, in fact, a strategic victory so complete and so overwhelming that the issue was never seriously in doubt. Coalition casualties were negligible and not one American

## Levels of War: German Blitzkrieg, 1940

Figure 2



- Levels overlap
- Activity at one level influences activity at another, but time and space factors require process of coordination to achieve synergistic effect.

tank was destroyed by enemy fire. Thus, in outline, Desert Storm bears a superficial resemblance to the 1940 blitzkrieg. The enemy whose territory was to be attacked provided an area of operations offering the space to execute brilliant and unexpected maneuvers. The victorious troops were commanded by leaders whose thinking relative to their opponents was unconstrained and who enjoyed the freedom of action to achieve decisive results. Moreover, the leaders commanded troops who were better trained and better equipped than their opponents. These points are worth considering in the context of all future American military operations.

What changed in 1991 was the sudden availability of precise deep-strike delivery systems on land and aboard ships and aircraft, combined with a vast inventory of lethal conventional munitions and long-range aircraft which could be guided by target-acquisition instruments to enemy targets under near constant surveillance. Equally important for the ultimate outcome was the decisive American overmatch in the direct-fire battle and the integration of tactical and strategic systems to support the tactical fight.

To a much greater extent than ever before, the theater commander was technologically positioned to influence action on the battlefield by directing global military resources to the points in time and space he regarded as critical to the campaign's success. For the Iraqi enemy, whose air defenses failed and whose intelligence-collection capability was either destroyed or deceived, the deep, close, and rear battles were compressed into one seamless, continuous fight. From the vantage point of the Iraqi command structure, the categories of American capabilities and weapon systems directed against Iraqi forces in terms of their strategic, operational, or tactical points of origin were

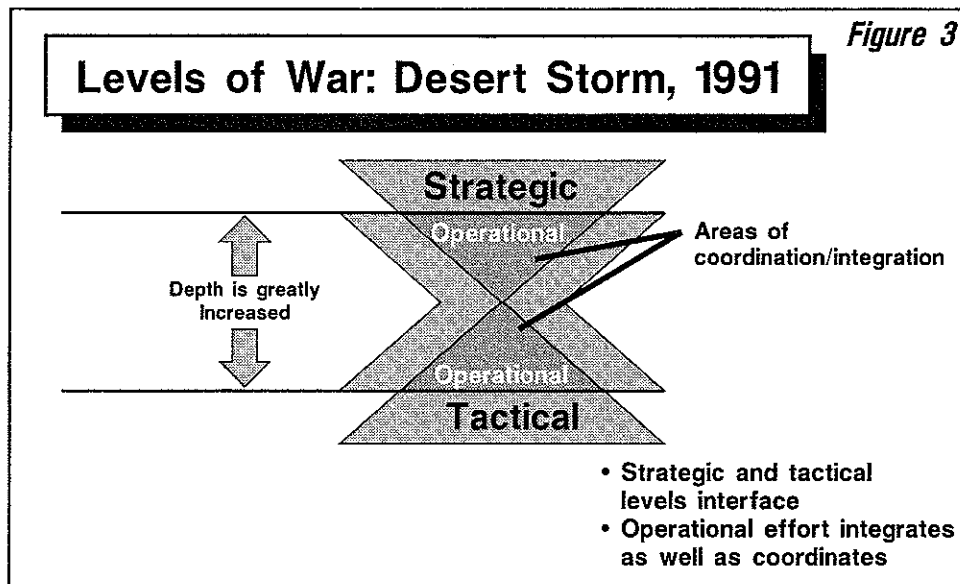
indistinguishable. In effect, Iraq was placed under global attack by US forces and subjected to a new form of multidimensional envelopment.

Of decisive importance was not the effect of a single factor, but rather of a combination of factors. On the one hand, the doctrine the Iraqi armed forces assimilated as a result of the decade-long conflict with Iran militated against Iraq's use of decentralized, mobile warfare. Iraq's most successful combat operations were patterned after Soviet concepts of static defensive warfare.<sup>12</sup> Although these attrition tactics—which incorporated many advanced forms of military technology, including Exocet missiles, Scud missiles, and remotely piloted vehicles—eventually wore down the Iranians, they were ineffective against the American-led coalition. Being steeped in this ponderous doctrine appeared to prevent the Iraqis from adopting a different form of warfare consistent with Iraq's new political-military objectives and strategic situation in 1990-91. Clearly, similar technology in different hands can be used in different ways and with different degrees of success.

From all indications, the Iraqis anticipated that their defensive posture would result over time in a stalemate. If the problem of projecting military power is viewed in a historical context, it is not hard to understand the Iraqi perception of time. In the months preceding the Allied landings in Europe in June 1944, 2500 heavy bombers dropped thousands of tons of explosives while 7000 fighters and fighter-bombers pulverized German forces in northern France. Nearly two years were required to assemble the naval transport and ground forces to support the invasion. What once took months, even years, was accomplished during Desert Shield and Desert Storm in weeks or even days by fewer but more specialized forces. By quickly establishing qualitative and quantitative superiority in the pre-ground-attack, strike forces were enabled to secure the initiative, accelerate the pace of events, increase the intensity of the total coalition attack, and reduce the time needed to prepare the Iraqi enemy for ground assault.

On the other hand, the American concepts of space and time were fundamentally different from the Iraqi concepts. American AirLand Battle doctrine predisposed the American armed forces to deploy specialized combat formations configured to exploit Iraqi weaknesses throughout the depths of the Iraqi defense system. New intelligence and target-acquisition sources substantially removed the climate of uncertainty which had plagued the senior leadership of earlier operations. Knowing precisely where to direct the main effort against the Iraqi defense was not a hit-or-miss proposition. Combined with real-time communications, these surveillance capabilities created the opportunity to direct redundant warfighting systems against Iraqi targets throughout the Southwest Asian theater of operations during all phases of Desert Storm.

Redundant strike systems such as the Army Tactical Missile System and sea-launched cruise missiles hastened the collapse of the Iraqi will to



resist—a condition which had characterized the campaigns in 1805 and 1940. Since nominally strategic capabilities could now be integrated for employment at any level of war simultaneously, Iraqi forces throughout the theater were compelled to operate as though they were all within visual range of American forces. Global positioning systems guided the smallest American combined-arms units into action with clinical accuracy as to location, even in hours of total darkness. By such maneuvers, the US VII Corps was enabled to attack from a direction and at a time that the Iraqi leadership was least prepared for. In response, the Iraqi armed forces (like their ill-fated predecessors, the Austrians and the French) simply lost coherency and fled the field or succumbed to destruction. This evolution is depicted schematically in Figure 3, which shows that as the total campaign effort approaches simultaneity within a greatly deepened theater, the three levels of war begin to overlap and interpenetrate to a substantial degree.

Leaving aside the political considerations which determined the duration of the campaign, the Gulf War ended with the recovery of Kuwait, the Coalition's stated goal. In an article titled "The War in the Persian Gulf: Lessons and Conclusions," three Russian general staff officers noted the massive use of cruise missiles, the employment of AWACS aircraft to direct the air offensive, the waging of electronic warfare to blind, confuse, and deceive the enemy, and the overall American capability to project air and naval forces globally in order to exert political influence. The authors, however, went on to register three important stipulations:

- The air offensive failed to destroy the Iraqi ground forces;
- The air offensive failed to destroy the Iraqi nuclear complexes;

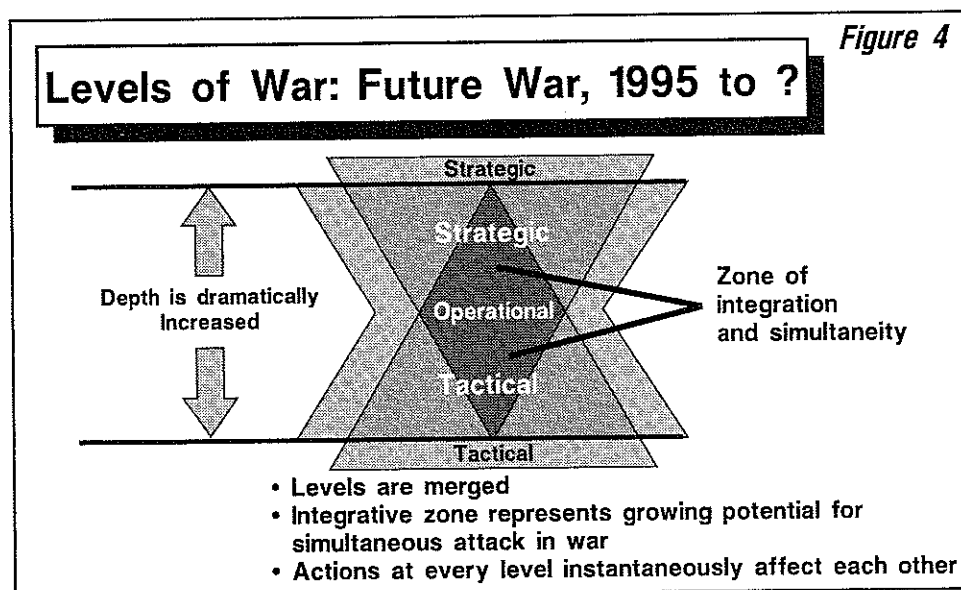
- It was the ground offensive that compelled the Iraqis to submit unconditionally to the American-led coalition forces.<sup>13</sup>

As in previous wars, only ground forces in concert with air and naval forces could fundamentally transform the geopolitical landscape and reorient hostile state-to-state relations to coincide with vital Coalition and American strategic interests.

### *Thinking About the Future*

The foregoing historical discussion against the backdrop of an evolving structure for the levels of war points to the possibility of dramatic change in the American concept and practice of warfare. New equipment and weapon systems, employed in great numbers at the critical points in time and space, now offer the potential for continuous offensive operations. They permit the retention of initiative and the exploitation of opportunities for the annihilation of the enemy's forces in a rapid, integrated campaign.

Although not definitive on the precise scenario a future conflict could take, the fourth evolution of the three levels of war (Figure 4) depicts a dramatically deepening battlefield where tempo increases by yet another order of magnitude and where the levels of war essentially merge. Lethal, precision-guided munitions are launched at still greater ranges, for the most part well beyond the visual range of the enemy. Smaller combined-arms combat formations with advanced indirect and direct-fire weapon systems dominate larger areas than in the past.<sup>14</sup> Aided by enhanced surveillance capabilities in the form of unmanned aerial vehicles, airborne radars, and





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**On 16 March 1991, ten days after cessation of hostilities, VII Corps Commander Lieutenant General Frederick Franks briefs Secretary of the Army Michael P. W. Stone on Operation Desert Storm at a site in Iraq.**

satellites, fewer forces are needed to concentrate the effects of combat power against the enemy. Rather than move to contact, combined-arms units will electronically search and then destroy the enemy on the battlefield.

This form of warfare collapses the three levels of war, so to speak, by enlisting the *tactics* of fire and movement directly in behalf of the strategic goal. The new structure of warfare integrates and synchronizes redundant, multiservice warfighting systems in simultaneous attacks on the enemy throughout his entire depth and in the space above him as well. All of this means that in future conflict the three levels of war, as separate and distinct loci of command and functional responsibilities, will be spaced and timed out of existence.

In the opening phases of future conflict, precision-guided missiles will play a decisive role in the effort to gain and retain the initiative. Carefully timed mass strikes will paralyze large ground and air forces that are dependent on frequent refueling and resupply and on fixed installations. When one side loses the initiative, the same weapon systems will be employed to regain it. The effect on friendly and enemy forces will be to further extend the depth of warfare, forcing all elements of US joint task forces to operate as if within visual range of the enemy, tending to compress rear, close, and deep combat operations into a continuous fight.

These developments occur in an environment where the distinctions between nuclear and nonnuclear weapons of mass destruction are less clear. This, in turn, raises the incentive for joint task force commanders to execute high-speed ground offensives that penetrate deep into the enemy's rear, where he is less likely to employ weapons of mass destruction because of the proximity of his own forces and population. Maneuvering on the battlefield, then, involves the deception, evasion, and defeat of dimly visible Unmanned Airborne Vehicles and tracking systems linked to terminally guided weapon systems.<sup>15</sup> In addition, weapons of mass destruction and theater missile defense systems provide cover and protection for joint task forces while they assemble and prepare for offensive operations.

Increasingly lethal air defense technology will also force jet fighters and bombers to higher and higher altitudes with the result that many pilots' roles will be taken over by a variety of unmanned weapon platforms.<sup>16</sup> In response to these developments, command and control structures will be designed to supply commanders at all levels with the information and communications to direct the dispersion or concentration of their own weapons' effects and forces.<sup>17</sup>

An important question raised by this vision of future conflict is whether it is still possible to create a framework for thinking about it? To put it another way, is this view of future war so complex that it defies generalization in any form? I believe it is possible to discern a few doctrinal constants governing future war:

- The commander must identify those points against which all lethal and nonlethal means must be concentrated in order to have the greatest overall effect on the enemy.
- The set of points selected for attack must consist of those elements of an enemy's armed forces, national military-industrial potential, and population whose destruction or disruption will directly undermine the capabilities to pursue his military aims.
- The critical set of points in time and space selected for attack must contribute to the operation's impact in a way that makes the whole operation greater than the sum of its individual parts—engagements, actions, and battles. In future war, this multiplied effect will be a function of the degree to which simultaneity of attack is achieved throughout the depth of the space bounding the enemy's forces and warfighting potential.
- Simultaneity will be achieved through the purposeful direction and synchronization of attacking joint and multinational forces in both offensive and defensive warfare.

These concepts are not to be considered a complete analytical framework, but they do represent an effort to move beyond the old Jominian-Clausewitzian categories of the linear battle, executed in time-phased

sequences, with the levels of war fastidiously differentiated. It seems clear that the fluidity and unpredictability of this environment will force commanders to rely less on prewar planning and more on prewar education and leadership training to guide decisionmaking at all levels in response to rapidly changing circumstances.

Such a view of future warfare necessarily assumes that conflicts will be limited only by the political stakes involved and the technological capabilities of the belligerents. Because the US Cold War defense community declined to confront the issue of warfighting with weapons of mass destruction, reasoning at each of the three levels of war tended to stop at a relatively low point on the hierarchy of potential violence. Clearly, the old political conditions no longer obtain. The new capabilities to command and control large, globally arrayed forces and to bring them to bear simultaneously against a multitude of widespread enemy targets in one theater of war will become the new and indispensable trademark of modern warfare.

Within the political context of future war, the disintegration of a world order with its roots in the treaties of Versailles and Potsdam gives no certain indication of the emergence of a new world order. Rather, the passage of the old order of international affairs suggests that surprise will almost certainly characterize the onset of future hostilities. A leaner American force structure protected by powerful stand-off means of combat and access to information on the disposition and movement of enemy forces will have to be ready to fight on extremely short notice.<sup>18</sup>

For all these reasons, the capability to synchronize combat operations within the full range of global warfare in support of simultaneous attack cannot be separated from personal command and generalship. Technologically compressed decision cycles will compound operational errors on a battlefield where weapons of mass destruction will be able to inflict catastrophic losses in a single engagement. For all their sophistication, advances in communications, information-processing technology, and surveillance systems will not produce absolute certainty.<sup>19</sup> Applied firepower will not substitute for strategy. The United States had tremendous advantages in military technological resources that seemingly dwarfed the capabilities of the North Vietnamese, but these could not cope with the manifold problems presented by the complex politico-military situation.<sup>20</sup>

Inevitably, resolute and intelligent leadership will be required to reach decisions on the basis of situations that cannot be predicted. Many leaders will be tempted to rely inordinately on firepower and electronically collected data, and to intervene at times and places where their intervention will be counterproductive. Commanders will have to strike a balance between exerting greater control in order to achieve the effects of simultaneous attack, on one hand, and maintaining a stance sufficiently flexible to permit opportunistic initiatives, on

the other. What was viewed in earlier conflicts as a localized battlefield success can rapidly be turned to operational and, ultimately, strategic advantage in the new setting. Further, this potential for decisive strategic results on the tactical level suggests that the operational commander must grant his subordinates sufficient freedom of action to achieve decisive results, even as tactical and strategic roles begin to accrue to the operational commander himself.

This brings into bolder relief the need for a uniform understanding of the senior commander's intent at all levels and in all services. Clearly established criteria for success in every operation will be vital to the successful transmission of the senior commander's end-state vision to subordinate commanders. These carefully articulated concepts will underpin successful targeting plans and strategies for a vast array of warfighting systems. No amount of bureaucratic arrangements to support joint military endeavors and to facilitate synchronization will contribute to success if the intended multi-service roles and the operational success criteria are not widely understood. In the end, the ingenious and thoughtfully directed interaction of air, ground, and sea-based combat forces will be based on a comprehensive understanding of doctrinal concepts, technology, force structure, training, and policy.<sup>21</sup>

Not as well understood but integrally related to these observations is the point that simultaneous attack is at first simply a concept existing in the mind of the commander. The future commander's grasp of the national military strategic aim, his readiness to accept risks, his intuitive feel for the battlefield (what the Prussians and Germans called *Fingerspitzengefühl*), and the success with which he transmits his end-state vision to subordinate commanders will still determine the outcome. Technology will extend human potential, but it can not substitute for it. Nor, for that matter, will it make the operational commander's job easier. On the contrary, the task of orchestrating simultaneous warfare with multiplied actors and weapon systems in expanded space at a magnified tempo will pose a daunting challenge to even the ablest leader.

Such complexity may tend to push the commander toward cookbook warfare, but that would be a mistake. Field Marshal Rommel observed during the 1942 Gazala battles in the North African desert that if the commander "fights his battles as a game of chess, he will become rigidly fixed in academic theory and admiration of his own ideas. Success comes most readily to the commander whose ideas have not been canalized into any one fixed channel, but can develop freely from the conditions around him."<sup>22</sup> Rommel's observation, valid even in 1942, will be absolute gospel for future war.

### *Coping With the Dimensions of Change*

Even before the Persian Gulf crisis began, there was ample basis for speculation about the nature of future war. In many ways, the cycle of modern weapons development and the sea change in international politics since 1991

have made it more difficult to identify trends and to make predictions. Developing warfighting doctrine for future conflict has been rendered more difficult because the character of the threat is no longer specified. In this environment, it is perhaps not surprising that Operation Desert Storm provided only temporary relief from domestic pressures to reduce defense expenditures.

One consequence of the disappearance of a well-defined threat has been that warfighting doctrine has usually lagged behind the revolutionizing impact on warfare of new technologies and tactics. An accurate depiction of this historical problem was offered by Admiral Alfred Thayer Mahan over a century ago:

Changes in tactics have not only taken place after changes in weapons, . . . but the interval between such changes has been unduly long. It can be remedied only by a candid recognition of each change. . . . History shows that it is vain to hope that military men generally will be at pains to do this, but that the one who does will go into battle with a great advantage—a lesson in itself of no mean value.<sup>23</sup>

Since warfare will always assume at least a partly unforeseen form, it would be imprudent to ignore the impact of new technology and new military applications. In each of the campaigns discussed earlier, the victorious armed force owed its success, in part, to factors that had been excluded from the prewar analyses of their opponents. Though historical hindsight often reveals particular forces acting toward the adoption of new tactics or weapons, there is no question that the interaction of technology and war is frequently the product of new conceptual thinking.

These comments notwithstanding, coping with the challenges of future warfare is easier to discuss than to put into practice. Vehicles will still have to be refueled, maintained, and repaired; weapon systems must still be supplied with more ammunition; soldiers must still eat and sleep. Blitzkrieg and Desert Storm both failed to eliminate the army's dependence on supply dumps. Moreover the new battlefield dynamics discussed in this essay will subject future combat leaders to physical and intellectual demands exceeding the traditional limits of human capability.

In sum, Desert Storm has provided the United States Army with a serviceable glimpse of future warfare. Playing a catalytic role for us analogous to that of the Ulm campaign in the thinking and analysis of professional soldiers in the late 19th century, Desert Storm has established new directions for future force and doctrinal development. Of course, ambiguities in the evidence for significant change during the Gulf conflict will continue to allow for different conclusions concerning the nature of future war. Yet, the trendlines are sufficiently well-etched to suggest that we go ahead and adapt our warfighting doctrine to future demands, even though the senior leadership cannot be completely certain what all of those demands might be.

## NOTES

The author is indebted to General Frederick M. Franks, Jr., Commander, US Army Training and Doctrine Command, whose vision of the future battlefield inspired the author to write this essay during a temporary assignment to the office of Concepts, Doctrine, and Developments. The author is also indebted to Major General Wesley K. Clark, former Deputy Chief of Staff for Concepts Doctrine and Development, US Army TRADOC, and his team whose work on "Battlefield Dynamics" has done so much to advance our understanding of future war; to Brigadier General Robert H. Scales, Assistant Deputy Chief of Staff for Combat Developments, US Army TRADOC, for his comments on an earlier draft. For any shortcomings in interpretation or presentation, however, I alone am responsible.

1. *Design For Military Operations—British Military Doctrine* (London: United Kingdom Ministry Of Defense, 1989), p. 40.

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